

XVI. *On the habits and economy of certain Hymenopterous Insects which nidificate in briars; and their Parasites.* By Sir SIDNEY SMITH SAUNDERS, C.M.G., V. P. Ent. Soc.

[Read 7th July, 1873.]

AT the last meeting of this Society I exhibited a series of Hymenopterous larvæ, lately received from Albania in their respective briar-cells.

Mr. Smith having kindly undertaken to figure the remarkable larvæ of *Raphiglossa* and *Psiliglossa*, as well as a new genus of Fossorial *Hymenoptera*, forming a connecting link between *Nitela* and *Pison*, I avail myself of this opportunity to supply some details of the habits and economy of these insects, all reared from briars on previous occasions, and now brought for exhibition; including a fine species of *Halticella* (one of the *Chalcididæ*), parasitic within the larva of *Osmia tridentata*, as herein described.

Raphiglossa Eumenoides, Saund.

Trans. Ent. Soc. Lond. Ser. 2, vol. i. p. 72 (1851),
Tab. 6, fig. 4, ♂, ♀.

Sauss. Mon. Guêpes Sol. vol. i. p. 2. 1.

Psiliglossa Odyneroides, Saund.

Raphiglossa, Saund. Sect. B., Trans. Ent. Soc. Lond.
Ser. 2, vol. i. p. 72 (1851), Tab. 6, fig. 2 ♂, 3 ♀.

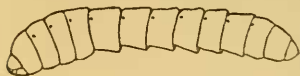
Stenoglossa, Sauss. Mon. Guêpes Sol. p. 4.

Psiliglossa, Saund. Trans. Ent. Soc. Lond. 1862,
p. 42.

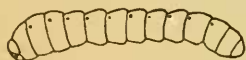
Both these elegant insects, belonging to the family of the *Eumenidæ*, frequent the plains around the Ambracian Gulf, where they select, in preference to other briars, those which are upright and soft, growing in moist situations, which, being exposed to the rain at top, are generally filled up towards the exterior with two or three inches of earth

to protect the larva cells, these being frequently continued down to the level of the soil; presenting in some instances as many as thirteen cells in a single stem.

The adult larvæ of *Raphiglossa*, as awaiting their pupa-metamorphosis, have already been described by me;* measuring about two-thirds of an inch in length and one-sixth of an inch in diameter, of firm fleshy consistency; their colour opaque-white; each successive segment presenting an overlapping margin; they are somewhat cylindrical and nearly of equal thickness throughout, with a slight distension about the thoracical region, and having the posterior margin of each of the abdominal segments below, vaulted and hollow.



Those of *Psiliglossa* I had not then observed, and it may be fitting, therefore, to institute a comparison between the two. The adult larvæ of the latter are nearly of the same length as the former, but of a pale yellow colour,



broader, somewhat compressed and shining, the segments strongly incised but contiguous, and not overlapping, nor vaulted and hollow beneath; gradually tapering and up-curved at each end when lying on their back. Not being cylindrical they do not execute the same gyratory movements as the former. They measure from 15 to 18 millimètres in length, by 4 to 5 in breadth, and from 2 to 3 in thickness; the smaller ones being those of the upper cells, which, as usual, produce males. The parts of the mouth in both these larvæ are indicated by piceous lines and patches.

The respective segments, which are very distinctly indicated, may be defined as follows: the five anterior, including the head, are compactly welded together and incapable of separate action in the pseudo-pupa state; the 3rd, 4th and 5th bearing a spiracle on either side.

The thoracical region terminating here, the two anterior segments are assignable to the development of the imago head, as pointed out by Ratzeburg.†

* Loc. cit. supra, p. 73.

† See Burmeister's Manual of Entomology, translated by Shuckard, p. 35, sec. 53. Note of Translator.

The remaining nine segments appertain to the abdominal region, whereof seven are furnished with a spiracle on either side; the last three segments, like the five anterior, being firmly united together.

By comparing these pseudo-pupæ of smallest and largest dimensions, as well as those occupying the extreme cells of a long serial sequence (representing males and females), the number of segments and their conformation as aforesaid are precisely identical. But on the development of the true pupæ, these three conjoined segments give rise to the additional abdominal segment and bivalved sexual organs in the male (Burm. § 152); which segments are wholly absorbed in the corresponding threefold organs of the female, comprising also the aculeus (l. c. § 143).

Thus Shuckard's remark (in the aforesaid note), "*that the larvæ of the males in the aculeate Hymenoptera will necessarily have an additional segment,*" does not coincide with these results.

The imago *Raphiglossæ* are accustomed to repose for the night in a very peculiar position, the conditions of rest being best provided for by affixing their powerful mandibles to some rough projecting edge of the briar and then distending their body and legs horizontally, without other support than the twisting of the wings lengthwise beneath the abdomen, which are retained in position by the posterior legs, although even this process is frequently dispensed with.

This gymnastic feat is accomplished as follows:—After resting awhile on a projecting snag, the *Raphiglossa* drew back, laying firmly hold of the snag with its mandibles, leaving its body and the four posterior legs quite free from the briar. Then by a rapid movement curving the wings down longitudinally on either side beneath the abdomen, and projecting the two posterior legs as it were to retain the wings thus in position, the tarsi remaining free, and bending the abdomen downwards, it took up its position for the night, the intermediate legs remaining suspended, but the knees of all doubled up close; now and then raising the abdomen without thereby disturbing the wings, which remained closely doubled down independently of such movement. The antennæ were laid back on either side of the head, the mandibles forming the sole means of support, the forelegs being also doubled up close to the thorax and the tarsi turned back out of the way; the body

projected outwards in the form of a crescent. Not unfrequently, after fixing the mandibles, a kind of somersault is performed, whereby the *Raphiglossa* remains in a horizontal position with the back below and the legs uppermost, as a favourite posture for repose. One that I sent alive to Professor Westwood to exhibit its performances, took up this position of repose for the night; and another, which I had subjected to the action of cyanide of potassium in this posture, quietly and unconsciously swooned away, still holding on in its asphyxy and remaining in situ after death.

Fam. CRABRONIDÆ.

Genus NITELIOPSIS.

Genus *Pisonem* cum *Nitelâ* nectens; huic habitu, illi tamen alarum constructione appropinquans.

Corpus parvum, nitidum.

Caput subrotundum. *Oculi* ovales, integri. *Antennæ* filiformes, thorace breviores, articulis brevibus, basali crassiore, secundo tertio et reliquis ferè æquè longis. *Mandibulæ* curvatæ, basi robustæ, prope medium excavatæ, apice acutæ, edentulæ. *Palpi maxillares* elongati, 6-articulati, articulo basali tenui, secundo robustiore, quarto longiore; tertio quinto sextoque brevioribus. *Labium* subcordatum, palpis labialibus brevibus, tenuibus, 4-articulatis, articulo basali elongato, 2^{do} et 3^{tio} obconicis, extimo apice acuto.

Thorax elongatulus, anticè constrictus, in medio latitudine capitis, elevatus, rugosus, posticè angustè productus, truncatus. *Pedes* omnes tenues. *Tibiæ* læves. *Tarsi* unguibus pulvilloque parvis. *Alæ* anticæ cellulis tribus submarginalibus et perfectis; quarum prima subquadrata; secunda minima, petiolata, venas duas recurrentes accipiens, primam basi propinquam, secundam ultra medium; cellula tertia angusta transversa, lateribus ferè parallelis, supernè ad primam submarginalem inclinans.

Abdomen ovato-conicum, læve, nitidum, thoracæ brevius, angustius, brevissimè pediculatum.

Species 1. *Niteliopsis Pisonoides*.

Nigra, nitida; mandibulis apice castaneis; clypeo in utroque sexu pilis albidis sericeis circumcincto; prothoracis

lineâ interruptâ albâ; scutelli lineolâ vel punctis duobus albidis; calcaribus tarsisque palpidis, his apice nigrescentibus. Femina.

Long. corp. 5—6 mill.

Expans. alarum 8—10 mill.

Mas, similis at minor, antennis apice acutis, 13-articulatis.

Long. corp. 4—5 mill.

Expans. alarum 7 mill.

Habitat in Insulis Ionicis (Coreyrâ et Leucadiâ) rubis exsiccatis. Imagines mense Julio maturatæ.

In Mus. nostro.

From one of the pupa-cases, in nowise differing from the others, the following parasite was obtained.

Homalus nanus, n. sp.

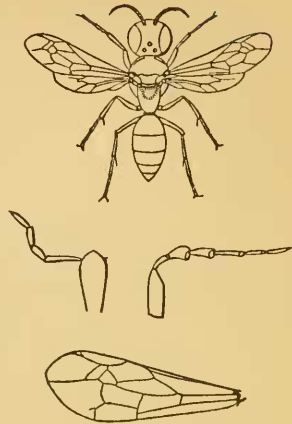
Aureo-violaceus, elongatulus; capite thorace, abdomineque, latitudine ferè cœqualibus, punctatissimis; antennis nigricantibus; meso-metathoraceque viridescentibus, maculâ centrali fulgente-aureâ; abdominis disco subobscurò, basi, apice, lateribusque viridi-cupreis; femoribus, tibiisque anterioribus viridi-violaceis; posticis, tarsisque omnibus, brunneis.

Long. corp. 4 mill.; expans. alar. 5 mill.

Exemplar unicum. In Mus. nostro.

Latreille, in his *Genera Crustaceorum et Insectorum* (tom. iv. p. 77, 1809), describes the genus *Nitela* as having the habitus of a *Tachybulus* (which he afterwards identifies with the genus *Pison* of *Spinola*, in his *Addenda*, p. 387), and the wings of a *Trypoxylon*, the marginal cell being however somewhat appendiculated in *Nitela*.

In the present genus the venation of the wings approximates to that of *Pison*, the second submarginal cell being strongly petiolated and receiving both recurrents, the first of these near the base, and the second rather beyond the middle of the cell; but, as Shuckard has pointed out in *Pison* (*Trans. Ent. Soc. Lond.* vol. ii.



p. 74), "there is great specific diversity in the form and size of the second submarginal petiolated cell, as well as in the mode of its receiving the recurrent nervures; which are sometimes interstitial, inosculating with the transverse cubital nervures, and sometimes received within it," as in *Niteliopsis*; while in his subgenus *Pisonitus*, "the first recurrent nervure is received towards the apex of the *first* submarginal cell, and the second recurrent about the middle of the *second* submarginal cell" (l. c. p. 79).

The antennæ however in *Niteliopsis* correspond with those of *Nitela*, having the second, third and following joints co-equal; whereas in *Pison* the second joint is considerably shorter than the third. In *Pison* also the eyes are emarginate, but in *Niteliopsis*, as in *Nitela*, entire. The maxillary and labial palpi also closely correspond in these latter; but the mandibles in *Niteliopsis* are simple as in *Pison*, and not bidentate at the apex, as those of *Nitela*.

Thus this genus would seem to form a connecting link between *Pison* on the one hand and *Nitela* on the other; whose affinities, in conjunction with *Trypoxylon*, had been recognized by Latreille as aforesaid; although later writers have removed the genus *Pison* from these cognate types, some to the *Nyssonidæ* and others to the *Larridæ*.

The pupa-cases of *Niteliopsis* are of light clay-coloured material, elongo-ovate, rugose and somewhat brittle; they are packed promiscuously amid a quantity of loose refuse of all kinds brought from without, and the gallery has no cellular separations.

Those of *Nitela* are smooth, of a dull carneous tinge, darkening towards the anal extremity; they are loosely placed in separate recesses of the pith, but, so far as I have noticed, in no regular series. Dr. Giraud, however, considers their presence in briars as exceptional, stating that they are more frequently to be met with in the trunks and branches of decayed trees, although he had also found their pupa-cases (which he accurately describes*) occupying four consecutive cells in a briar from Fontainebleau.

The transformations of *Trypoxylon* have been carefully recorded by Messrs. Dufour and Perris in an interesting Mémoire on the Hymenopterous insects reared from briars,

* Ann. Soc. Ent. Fr. 4^e série, tome vi. p. 474. 1866.

published in the Annales of the Entomological Society of France.*

The *Pison Jurinei* of Southern Europe also provides for its progeny in briar-stems, where I have found them in the pseudo-pupa state, as follows:—

Pison Jurinei, Spin.

Alyson ater, Spin. Ins. Ligur. tom. ii. fasc. 4, p. 253.

Pison Jurinei, *ibid.*, p. 256.

Pupa-cases griseous, rugose, ovate, somewhat brittle, in serial sequence without intermediate divisions, but partially connected together and with the excavated gallery by a scarcely perceptible web corresponding with the puparia themselves.

On opening one of these cases I found a broad pale-stramineous curved pseudo-pupa, having the segments strongly incised, with the head closely bent down to the centre of the body, where firmly retained and motionless.

The briar in which these puparia were found was completely excavated to the depth of nine or ten inches, presenting six of the aforesaid dusky cinereous cases smaller than the gallery itself, but adhering thereto; one close to the bottom; two contiguous to each other after the interval of an inch; two more also close together an inch above these; and the sixth half an inch higher. Above these cells was a thin transverse mud partition, but not at the extreme top. The puparia, which were similar at each end, measured about 8 mill. in length by 3 mill. in diameter.

From the shores of the Ambracian Gulf, near Prevesa. The perfect insects appear towards the end of June or in July.

Fam. CHALCIDIDÆ.

Genus HALTICELLA, Wlk.

Walker, Notes on Chalcid: Part 3, p. 39, 1871; Sichel, Ann. Soc. Ent. Fr. 4e série, tome 5, p. 347, 1866. (*Hockeria*, De Lap.)

Caput inerme, muticum.

Abdominis petiolus subnullus.

* Ann. Soc. Ent. Fr. 1^e série, tome ix. p. 28, 12, tab. 3, fig. 37—41. 1840.

Antennæ prope os insertæ.
 Tibiarum posticarum apex non acuminatus.
 Metatarsi graciles.

Halticella Osmicida, n. s.

Fem. Nigra; abdominis segmentibus 1o, 2o, 3o, 4o-que (hoc margine excluso), femoribusque posticis, rufis.

Caput transversum, densissimè punctatum, thoracis latitudine; oculi magni, distantes, prominuli; antennæ nigrae, 10-articulatae, thoracis ferè longitudine, articulo basali elongato, depresso, secundo brevi, reliquis subaequalibus; thorax crassè punctatus, pilis albidis compressis instructus; abdomen conicum, articulis quatuor basalibus lucentibus rufis, quarto margine obscuro, reliquis nigris, pilis albidis compressis instructis; terebrâ brevi, nigrâ; alæ fumatae, basi pellucidae, venis fuliginosis; pedes obscuri, tibiis nigro-albescentibus, femoribus posticis valdè incrassatis, posticè subemarginatis, unidentatis, rufis.

Long. corp. (cum terebrâ) 10 mill.; exp. alar. 12 mill.

Mas, penitus niger, abdomine nitente, alis minus obscuris, basi pellucidis.

Long. corp. 8 mill.; exp. alar. 12 mill.

Hab.—Epirus, in rubis exsiccatis.

This parasite feeds on the adult larvæ of *Osmia tridentata* within their closed pupa-cases, the said larvæ becoming reduced thereby to an empty desiccated blackened shell of the same shape and dimensions as before, within which these *Halticellæ*, each occupying the interior of a single larva, undergo their metamorphoses, having the head directed towards the broad anal segments of the larvæ, thus pointing downwards in the briar cells, and issuing therefrom in the imago state about the middle of June.

Larva: milk-white, slightly recurved, gradually tapering towards each end, the anal extremity smaller than head; divisions of segments strongly arched and deeply incised, having large intermediate dorsal folds, so that for each ventral and lateral division there appear to be two dorsal folds, gradually sloping off on each side.

Length 10—11 mill.; breadth 3—4 mill.